

## Current status of bariatric surgery perceptions in Hail region, Saudi Arabia

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### ABSTRACT

**Background:** Obesity is a chief communal health dilemma that considered an epidemic worldwide including Saudi Arabia, where the preferred method for weight loss is bariatric surgery. The presence of some misconceptions among some people in Saudi society may cause a decrease in the level of making the right decisions and the appropriate way to deal with their weight. **Aim:** The current study conducted to evaluate the awareness of the adult population in the Hail region as regards to the safety, usefulness, as well as the consequences of bariatric surgery as an option for weight loss. **Methodology:** A cross sectional web survey administered to include Saudi adults' population older than 15 years of their age in the Hail region, from January to August 2022. **Results:** A 400 participants from Hail, Saudi Arabia responded to the web survey. With respect to demography, 76% of participants were aged 15-30 years old. Most (61.5%) were male. A 56 (14%) of the participants had a medical history of obesity. Regarding participants' perceptions regarding obesity, factors that aid in weight reduction, and bariatric surgery, it was found that most participants had an intermediate level of awareness. **Conclusion:** It should shed light on the role of physicians and health educators in informing patients and providing them with the essential details to augment their knowledge and awareness regarding obesity, ways to lose weight and bariatric surgery.

**Keywords:** Attitude, Bariatric surgery, Bypass surgery, Gastric sleeve, knowledge, Obesity, Weight loss.

### 1. INTRODUCTION

At this time, obesity is a foremost public well being trouble and is considered an epidemic worldwide including in Saudi Arabia (Kelly et al., 2008; Ng et al., 2014). The frequency of obesity has risen from 7% to 25% over the past 30 years, and by 2030 it is expected that obesity will influence 60% of globe inhabitants (Kelly et al., 2008). Worldwide, it is expected that the number of obese people to exceed 650 million. Compared with people with healthy weight the risk of premature death in obese individuals is approximately greater than 1.3 times (Kivimäki et al., 2022). According to the Global Burden

of Disease 2017 more than 4 million people die each year because of overweight or obesity (Althumiri et al., 2021). In Saudi Arabia it is estimated that one person out of every three adults is obese. In addition one person out of every ten adults suffers from morbid obesity (Al-Khaldi et al., 2016). It was found that 4.7% of the Saudi populations, in general, suffer from obesity, in comparison with 13% prevalence, in the whole world. The Hail region has reported the highest prevalence level in Saudi Arabia with an obesity prevalence of 63.6% (Ahmed et al., 2014). In reference to the World Health Organization, in general, people with a body mass index (BMI) equivalent to, or larger than 25 and those equivalent to, or larger than 30 are deemed overweight and obese respectively. Never the less if a BMI is more than 40 kg/m<sup>2</sup> then it is considered morbid obesity. Fat accumulation is also considered an indicator of overweight and obesity (Fitch and Bays, 2022). Obesity is a syndrome in consequence of multiple hereditary, ecological, social and cultural issues (Favieri et al., 2021; Popkin et al., 2020). Because obesity has been estimated as among the top five causes of death worldwide, and thus obesity related diseases have become more important and serious health problems (Abouhamda et al., 2016; Aboulghate et al., 2021; Güler et al., 2018). People who are obese have an increased risk of many diseases such as hypertension, elevated levels of glucose in the blood and urine, sleep disorders, emotional disorders, osteoporosis, and other diseases (Burridge et al., 2022; van der Valk et al., 2018).

In Saudi Arabia the preferred method for weight loss is bariatric surgery (Alkhaldy et al., 2019; Fetuga et al., 2011). Although bariatric surgery is the preferred method in Saudi Arabia some Saudi society expresses exaggerated beliefs about bariatric surgery and its complications that might constitute a barrier towards weight loss surgery. In addition to the presence of some misconceptions among some people in Saudi society this may cause a decrease in the level of making the right decisions and the appropriate way to deal with their weight. Therefore the patient's perception (knowledge and attitude) about bariatric surgery (types, effectiveness, indications, valuable health influences, and healthiness results) is a paramount matter (Bianciardiet al., 2021). As the person's attitude and knowledge about bariatric surgery have a major role in determining the type he/she will choose or the appropriate method for losing weight which may help reduce psychological effects and maintain weight loss and good weight management after surgery. Research on bariatric surgery that deals with knowledge and attitudes of the population towards bariatric surgery and its effects and complications in Saudi society are uneven and few. Consequently the present study examined adult awareness and attitudes about bariatric surgery as an option for weight forfeit and to determine the incidence of obesity in Hail region.

## 2. MATERIALS AND METHODS

### Study design and population

A cross sectional study (January to August 2022) included adults from Ha'il region, Saudi Arabia.

### Sampling and Sample size

The sample size was calculated by the Raosoft sample size calculator (Alsofayan et al., 2022). The standard deviation was adjusted at 1.96 for 95% CI. The error margin was set at  $\pm 5\%$ . The calculated sample size was 384. We increased the sample size to 400 participants by adding 4% ( $n = 15$ ) to account for non respondents and any lost data, we formed a representative sample for the administrative region of Hail ( $N = 400$ ).

### Study instrument

Using a pre translated electronic questionnaire, the data collected included: Social and demographic data, smoking habit, a medical history of obesity, anthropometric characteristics (length in cm), (weight in kg), and fifteen items assessment of participants' knowledge and attitudes toward bariatric surgery. The assessment items were divided into three sections. First section contains five items on the perception related to obesity; the second section contains five items on the perception related to the factors that aid in reducing body weight, whereas the third section contains the remaining five items on the perception of bariatric surgery.

### Data management

On the 15 items of assessment correct answer was given a value 1, whereas 0 was given for an incorrect answer. Then the total scores were calculated with the highest score being 15 and the lowest score being 0. Participants whose score was less than 5 were considered to have poor awareness. Those who scored from 5-10 were considered to have average awareness while good awareness was achieved if participants scored above 10. Data were extracted, reviewed, and coded in statistical software for data analysis IBM SPSS version 22.0 (SPSS, Inc Chicago, IL). A descriptive analysis was carried out by repetition and proportion to all variables including demographic data, items of awareness, and attitudes. Chi squared test was used to compare groups, P-value less than

0.05 was deemed significant. The results of the study were presented through tables, graphs and pie chart.

### Ethical consideration

Ethical authorization was attained from Medical Research Ethics Committee at Hail University. In addition, the study purposes were elucidated to participants, and informed consent was obtained prior to voluntarily participation.

## 3. RESULTS

A total of 400 participants from Hail region in Saudi Arabia responded to our survey. Responses were collected from April to August 2022. All respondents completed the survey giving a response rate of 100%. The study included 246 (61.5%) males and 154 (38.5%) females, with male to female ratio of 1.6:1. Their age ranged from 15 to 57 years, with a mean age of 28.13 years. Approximately 268 (67%) were single unmarried. As regards to educational level, 336 (84%) were university graduate. Eighty six (21.5%) of the participants were cigarette smokers, 278 (69.5%) had income of less than 10,000 Saudi riyals (2,667 US dollars), while only 56 (14%) of them had a history of obesity (Table 1).

**Table 1** General characteristics of the studied sample, Hail, Saudi Arabia.

Characteristics		n=400	%
Age (years)	15 – 30 years	304	76
	31 – 40 years	46	11.5
	41 – 50 years	42	10.5
	>50years	8	2.0
Gender	Male	246	61.5
	Female	154	38.5
Marital status	Married	132	33
	Unmarried	268	67
Educational level	Primary/Middle school	4	1.0
	High school /Diploma	38	9.5
	University	336	84
	Postgraduate	22	5.5
Family income per month (riyal)	Less than 10000 riyals	278	69.5
	10,000 –20,000 riyals	108	27
	More than 20,000 riyals	14	3.5
Smoking habit	Smoker	86	21.5
	Non-smoker	314	78.5
A medical history of obesity	Yes	56	14
	No	344	86

Table 2 shows the participants' anthropometric merits; their mean height was  $167.56 \pm 9.536$  cm, mean weight was  $75.24 \pm 18.821$  kg, and their mean calculated BMI was  $26.79 \pm 6.383$  kg/m<sup>2</sup>.

**Table 2** Anthropometric Measures of the Study Population

	Mean $\pm$ SD	Range
Length in centimeters	$167.56 \pm 9.536$	142- 191
Weight in kilograms	$75.24 \pm 18.821$	44 – 156
Body mass index (BMI) (kg/m <sup>2</sup> )	$26.79 \pm 6.383$	16 – 69

When investigating the medical history of obesity of the participants, the results of the study showed that 56 out of 400 participants had a medical history of obesity, many of them (71.4%) are aged between 15 to 30 years, males constituted 60.7%, most of them were unmarried (57.1%), 82.1% were university graduates and the vast majority 71.4% were non smokers (Table 3).

**Table 3** Participants who have a medical history of obesity

<i>A medical history of obesity</i>		<i>n=56</i>	<i>%</i>
Age (years)	15 – 30 years	40	71.4
Gender	Male	34	60.7
Marital status	Unmarried	32	57.1
Educational level	University	46	82.1
Family income per month (riyal)	less than 10,000 riyals	38	67.9
Smoking habit	Non-smoker	40	71.4

The table 4 shows perceptions of participants regarding obesity, factors that aid in weight reduction, and bariatric surgery, the majority 338 (84.5%) of participants believe obesity is a disease. Almost two thirds of participants 240 (60%) believe excessive eating is not the only cause of obesity, 300 (75%) believe genetics play a role in obesity, also 266 (66.5%) believe psychiatric illness can lead to obesity. Regarding the perception of participants regarding factors that aid in weight reduction, most of the participants 386 (96.5%) believe exercise can decrease weight, also 278 (69.5%) believe drinking plenty of water can decrease weight, 254 (63.5%) believe adequate sleep can decrease weight, and only 62 (15.5%) of participants calculating intake of calories of food they eat. Regarding the perception of participants toward bariatric surgery, 324 (81%) believes that the quickest & easiest way to lose weight is to have surgery. However, almost 338 (84.5%) of participants believe bariatric surgery has complications and 254 (63.5%) believe these complications can cause death, whereas 294 (73.5%) of the participants believed that weight loss with bariatric surgery is not the best option.

**Table 4** Perceptions of the respondents towards obesity and weight reduction surgeries

	<i>Yes</i>	<i>No</i>	<i>Don't Know</i>
<i>Replies to questions on perception related to obesity</i>			
Do you believe that obesity is a disease?	338(84.5%)	24(6%)	38(9.5%)
Do you practice sport?	222(55.5%)	164(41%)	12(3%)
Does genetics play a role in obesity?	300(75%)	58(14.5%)	42(10.5%)
Do you think excessive eating is the only cause of obesity?	144(36%)	240(60%)	16(4%)
Psychiatric illnesses, e.g. anxiety, lead to obesity?	266(66.5%)	72(18%)	62(15.5%)
<i>Replies to questions on perception related to the factors that aid in reducing body weight</i>			
Do you think that adequate sleep helps in losing weight?	254(63.5%)	52(13%)	94(23.5%)
Eating fruits leads to weight loss?	138(34.5%)	192(48%)	70(17.5%)
Losing weight can be achieved by drinking copious water? Is sport effective for losing weight?	278(69.5%)	68(17%)	54(13.5%)
Is your calorie intake calculated?	386(96.5%)	8(2%)	6(1.5%)
	62(15.5%)	328(82%)	10(2.5%)
<i>Replies to questions on perception towards bariatric surgery</i>			
Does bariatric surgery decrease body weight?	324 (81%)	20 (5%)	56 (14%)
The quickest & easiest way to lose weight is to have surgery?	324(81%)	20(5%)	56(14%)
Do you think that bariatric surgery has complications?	338(84.5%)	8(2%)	54(13.5%)
Bariatric operations can cause fatal complications.	254(63.5)	38(9.5%)	108(27%)
Weight loss with bariatric surgery is the best option?	54(13.5%)	294(73.5%)	52(13%)

The table 5 shows the distribution of the socio-demographic features of the respondents and their knowledge and awareness level regarding obesity and bariatric Surgery. Chi square analysis for awareness level and the socio-demographic features showed significant associations with marital status, whereas the single group showed higher level of awareness ( $p=0.026$ ). The study showed most participants possessed an intermediate level of awareness (Figure 1). With respect to age differences in awareness levels, 45.5% of the younger participants (aged between 15 and 30 years) possessed a good awareness level, while 53% from the same age group, approximately 73.5% of the age group 31-40, and 62% of the age group 42-50 years had an intermediate awareness

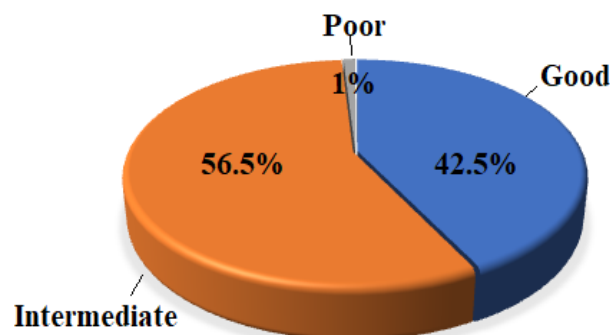
level. Also, 50% of the age group over 50 years had an intermediate awareness level. With respect to gender, 55% of males and 58.4% of females had an intermediate awareness level. Regarding marital status differences in awareness levels, 65% of married and 53% of unmarried had an intermediate awareness level. Regarding educational level differences in awareness levels, 50% of primary and middle school, 79% of high school and diploma, 53.5% of university and 67% of post graduated participants had an intermediate awareness level.

With respect to family income differences in awareness levels, 57% of participants with 5000-10000 riyals income, 55.5% of participants with less than 5000 riyals income and 57% of participants with more than 10000 riyals (2667 US dollars) had an intermediate awareness level. With respect to smoking habit differences in awareness levels, 58% of smokers and 56.5% of non smokers reported intermediate awareness level. Finally, regarding the medical history of obesity differences in awareness levels, 54% of participants with a medical history of obesity and 67% without a history of obesity had an intermediate awareness level.

**Table 5** Selected characteristics of the sample and the association with The Awareness Level regarding Obesity and Bariatric Surgery

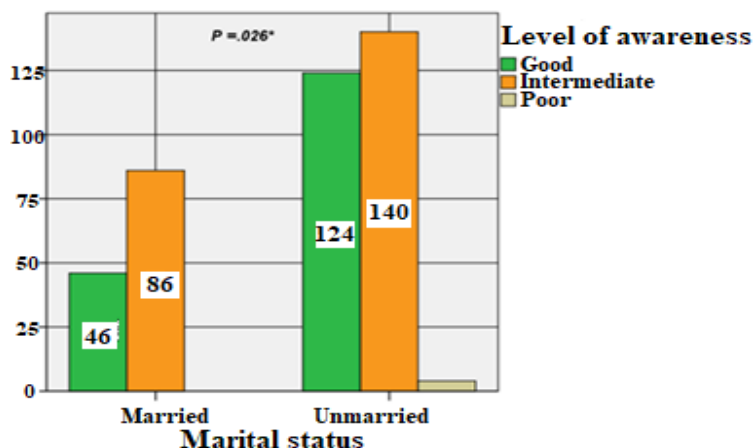
		Awareness Level			P
Characteristics		Good	Intermediate	Poor	
Age (years)	15 – 30 years	138(34.5%)	162(40.5%)	4(1%)	.212
	31 – 40 years	12(3%)	34(8.5%)	0	
	41 – 50 years	16(4%)	26(6.5%)	0	
	>50years	4(1%)	4(1%)	0	
Gender	Male	108(27%)	136(34%)	2(0.5%)	.710
	Female	62(15.5%)	90(22.5%)	2(0.5%)	
Marital status	Married	46(11.5%)	86(21.5%)	0	.026*
	Unmarried	124(31%)	140(35%)	4(1%)	
Educational level	Primary/Middle school	2(0.5%)	2(0.5%)	0	.131
	High school /Diploma	8(2%)	30(7.5%)	0	
	University	152(38%)	180(45%)	4(1%)	
	Postgraduate	8(2%)	14(3.5%)	0	
Family income per month (riyal)	5000 – 10,000 riyals	118(29.5%)	158(39.5%)	2(0.5%)	.884
	Less than 5000 riyals	46(42.5%)	60(55.5%)	2(0.5%)	
	More than 10,000 riyals	6(1.5%)	8(2%)	0	
Smoking habit	Smoker	36(9%)	50(12.5%)	0	.560
	Non-smoker	134(33.5%)	176(44%)	4(1%)	
A medical history of obesity	Yes	20(5%)	36(9%)	0	.358
	No	150(37.5%)	190(47.5%)	4(1%)	

\*: Statistically significant.



**Figure 1** The awareness level regarding the obesity and bariatric surgery

Figure 2 shows that marital status correlates with awareness level about obesity and bariatric surgery, whereas unmarried respondents scored highest in this area (good awareness level). The difference was statistically significant ( $p=0.026$ ).



**Figure 2** The Association between the marital status and the awareness level regarding obesity and bariatric surgery

#### 4. DISCUSSION

The current study conducted in the Hail region assessed adult health beliefs about bariatric surgery as an option for weight loss, and their opinions about its safety, efficacy and consequences. When investigating the participants' medical obesity history the results of our study showed that 56 out of 400 participants had a medical history of obesity. The majority of 56 participants: were people aged 15-30 years, males, unmarried, those with an income of less than 10 thousand Saudi riyals and non smokers as these results do not correspond to the results of a previous study conducted in the Riyadh region, where obesity tends to affect older adults, those who are married and those with higher incomes (Aldawqi et al., 2018). In similar way the result obtained also was in contradiction to the previous study conducted in the Hail region when the obesity was more prevalent among Saudi females (Ahmed et al., 2014). It was also reflected in another study conducted in Saudi Arabia (Alkhunizan et al., 2018).

The majority of the participants displayed intermediate level of awareness regarding increased weight and its risk determinants. A 266 (66.5%) of the participants considered mental illnesses such as anxiety and depression as pivotal factors for obesity, and on the other hand, 300 (75%) of the participants believed that the genetic factor is also a risk factor for obesity. This was in consistent with a previous study, in which, most of the participants had good understandings of obesity's risk determinants, when near to three quarters of the respondents believed that the genetics, and almost half of them had chosen mental illnesses as a risk factor for gaining weight (Aldawqi et al., 2018; Hinney et al., 2022; Lin and Li, 2021). In addition the current study displayed that the most participants demonstrated an intermediate knowledge about practices that may help lose weight with 386 (96.5%) referring to exercise, 278 (69.5%) to drinking plenty of water, and 138 (34.5%) to eating fruits as means that may help on weight loss. This is consistent with the results of another study which showed that most of the participants have good knowledge about practices that may help in losing weight such as exercise, excessive water and fruit in take (Aldawqi et al., 2018).

Considerably a higher proportion of participants indicated the importance of exercise and drinking plenty of water. Despite this, only 222 (55.5%) of the participants, "about half of the participants", exercised. The results of our study are consistent with the results of the previous study, which also showed that sports were practiced by only about half of the participants (Aldawqi et al., 2018). The low level of physical activity plays a very important role in increasing obesity rates (Pojednic et al., 2022; Xiao et al., 2022), in addition to the fact that there is a link between low fruit intake and high body mass index (Aiello et al., 2022; Nyanchoka et al., 2022). In general current study showed that the level of awareness to obesity and weight reduction surgeries not influenced by sex, educational level, economic status, smoking habits and a history of obesity. On the other hand, social status had found to influence the level of knowledge and awareness of the participants. This was in line with others, when most of Jeddah residents held adverse attitudes towards bariatric surgery, with gender, educational level, economic, matrimonial, and job status having no significant influence (Abouhamda et al., 2016).



**Strength and limitation of the study**

The strengths of this study are the lack of sufficient studies in the Hail region that focus on the perception of the population's knowledge and attitudes about bariatric surgery. This calls for highlighting and attention to conduct more research and provide advice to patients suffering from obesity and overweight. This study has a limitation, as it targeted the adults aged 15 years and over, thus, neglected those less than 15 years of their age.

**5. CONCLUSION**

Knowledge and awareness towards obesity and bariatric surgery in Hail, is generally intermediate, as most of the participants in Hail region prefer to follow other methods of weight loss instead of bariatric surgery. These findings should prompt further investigation and attention. The largest percentage in our study was of normal BMI. This difference may be the result of the difference in the studied community. It is expected that demographic and social factors, customs, and traditions in each society may contribute as influencing factors in obesity and levels of awareness. The role of physicians and health educators should be to shed light on informing patients and providing them essential acquaintances to augment their knowledge and awareness towards obesity and its surgical management. In addition continuing educational programs about obesity and bariatric surgery to address misconceptions about obesity, obesity operations, and weight loss methods; this contributes to raising the level of community awareness, enabling people to make the right decisions and the appropriate way to lose weight.

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**Authors' contribution**

Fauwaz FA: Served as the principal conductor was instrumental in conceptualizing the manuscript and contributed heavily to its introduction, results and discussion.

Saadeldin AI: He coordinated the task, stating the contents of manuscripts and review of study statistics and redrafting of an essential intellectual component.

Hassan AA: A contributor to study design, drafting introductions and reviewing central academic component in a decisive manner.

Abdullah DA: Assisted with data organization, reorganized manuscripts for inclusion led result division and finalized outline of manuscript.

Hamoud SA: Assist in data collection, recognizing the interrelated manuscript for addition and donated in material and approaches.

The manuscript was conceptualized, edited and reviewed by all authors in different ways.

**Ethical approval**

The ethics committee at the University of Ha'il, KSA, granted research ethics approval (Code: H-2022-260).

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**Conflicts of interest**

The authors and their collaborators do express no any kind of conflict of interest.

**Data and materials availability**

The all data allied to this study are present in the purview of the manuscript.

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